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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/632,376	08/01/2003	Seong-Taek Hwang	5000-1-418	4169

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EXAMINER

DIACOU, ARI M

ART UNIT	PAPER NUMBER
3663	

DATE MAILED: 07/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/632,376	HWANG ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Ari M. Diacou	3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 6/9/05
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>6/9/05</u> | 6) <input type="checkbox"/> Other: _____  |

*KL*

**DETAILED ACTION**

***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

*a.* A broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. See MPEP § 2173.05(c). Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949). In the present instance, claim 1 recites the broad recitation "belonging to the C-band", and the claim also recites "a peak value in a predetermined wavelength range" which is the narrower statement of the range/limitation.

Art Unit: 3663

*b.* A broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. See MPEP § 2173.05(c). Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949). In the present instance, claim 6 recites the broad recitation "belonging to the C-band", and the claim also recites "a peak value in a preset wavelength range" which is the narrower statement of the range/limitation.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Art Unit: 3663

4. Claims 1, 3, 4 and 11 are rejected under 35 U.S.C. 102(e) as being anticipated by Cowle et al. (USP 6441953 B1).

In regard to claim 1, Cowle discloses:

“A thulium-doped fiber amplifier [Fig. 1, #5] comprising: a thulium-doped fiber [Fig. 1, #40; Column 2: line 60] to amplify optical signals belonging to S-band [ Col. 2; lines 3-6 : While Cowle does not specifically disclose the operating wavelength in the “S-band” per se, Kinoshita (Fig. 1) teaches that the S-band is composed of light in the wavelength range 1490-1530 nm, therefore the operating wavelength range for the second pumping source disclosed by Cowle (1520-1620 nm) does fall in the S-band that is conventionally accepted by the literature.]; a first pumping unit configured to output an amplified spontaneous emission that represents a peak value in a predetermined wavelength range belonging to C-band to pump the thulium-doped fiber [Fig. 1, #10]; and a second pumping unit to output pumping light belonging to the C-band and a different wavelength [Fig. 1, #110] band to pump the thulium-doped fiber.”

In regard to claim 3, the wavelength of the first pump can be found on Column 3, line 6.

In regard to claim 4, the wavelength of the first pump can be found on Column 3, lines 51-56.

In regard to claim 11, Cowle discloses:

“A thulium-doped fiber amplifier according to claim 1, further comprises a second isolator, disposed between the first and second pumping units [Fig. 1, #140], to block light inputted from the side of the thulium-doped fiber, wherein the first pumping unit is disposed in the front of the thulium-doped fiber and performs front-pumping of the thulium-doped fiber.”

Drawings and pictures can anticipate claims if they clearly show the structure which is claimed. In re Mraz, 455 F.2d 1069, 173 USPQ 25 (CCPA 1972).

### *Claim Rejections - 35 USC § 103*

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

Art Unit: 3663

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cowle in view of Zirngibl (USP 5128800). Cowle discloses a two-stage optical amplifier that uses fiber amplifiers doped with rare earth elements and explicitly suggests Erbium and Thulium [Col. 2, line 60], but fails to disclose a feedback loop in one of the stages. Zirngibl teaches that attaching a feedback loop comprising a filter to an EDFA will stabilize the gain produced by that module [Col. 1, lines 62-65]. Therefore, it would have been obvious to one of ordinary skill in the art (e.g. an optical engineer) at the time the invention was made to introduce a feedback loop into the first stage of the optical amplifier, for the advantage of increased pump conversion efficiency.

8. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cowle as applied to claims 1, 3, 4 and 11 above, and further in view of Zirngibl (USP 5128800). Cowle discloses a two-stage optical amplifier that uses fiber amplifiers doped with rare earth elements and explicitly suggests erbium and thulium [Col. 2, lines 1-3 and 57-60], but fails to disclose a feedback loop in one of the stages. Zirngibl teaches that attaching a feedback loop comprising a filter [Fig. 7, #73] and an isolator [Fig. 7, #75] to an EDFA will stabilize the gain produced by

Art Unit: 3663

that module [Col. 1, lines 62-65]. Therefore, it would have been obvious to one of ordinary skill in the art (e.g. an optical engineer) at the time the invention was made to introduce a feedback loop into the first stage of the optical amplifier, for the advantage of increased pump conversion efficiency.

9. Claims 2 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cowle as applied to claims 1, 3, 4 and 11 above, and further in view of Zirngibl and Flood et al. (USP 6233092). Cowle discloses a two-stage optical amplifier that uses fiber amplifiers doped with rare earth elements and explicitly suggests erbium and thulium [Col. 2, lines 1-3 and 57-60], but fails to disclose a feedback loop in one of the stages. Zirngibl teaches that attaching a feedback loop comprising a filter to an EDFA will stabilize the gain produced by that module [ pg. 561, last paragraph]. Therefore, it would have been obvious to one of ordinary skill in the art (e.g. an optical engineer) at the time the invention was made to introduce a feedback loop into the first stage of the optical amplifier, for the advantage of increased pump conversion efficiency. What Cowle and Zirngibl fail to do is teach why the EDFA is producing amplified spontaneous emission instead of some other particular characteristics of radiation. Flood teaches that the ASE produced by an EDFA in one phase of an optical amplifier can be used to pump a subsequent stage of said amplifier, especially if the frequency of the pumping radiation required falls in the C- or L-bands of the infrared spectrum [Col. 2, lines 17-22]. Therefore, it would have been obvious to one of ordinary skill in the art (e.g. an optical engineer) at the time the invention was made to have a first stage of an optical amplifier comprising an EDFA and a feedback loop

Art Unit: 3663

selectively filtering C-band radiation using said first stage to pump a subsequent stage comprising a TDFA, for the advantage of increased pump conversion efficiency.

***Allowable Subject Matter***

10. Claims 5, 10 and 12 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

With regard to claim 5, the prior art does not teach or make obvious the use of a 980 nm source to pump a thulium-doped fiber, and therefore the use of two 980 nm pumps is not obvious.

With regard to claim 10, the prior art does not teach or make obvious the use of two pumping frequencies for a thulium-doped fiber.

With regard to claim 12, the prior art does not teach or make obvious using a backward pumping mechanism on a thulium fiber, although backward pumping of an erbium fiber is known in the art.

***Conclusion***

11. The prior art cited as art of interest and not relied upon is considered pertinent to applicant's disclosure.


Art Unit: 3663

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ari M. Diacou whose telephone number is (571) 272-5591. The examiner can normally be reached on Monday - Friday, 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on (571) 272-6878. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AMD 6-22-2005

  
JACK KEITH  
PRIMARY EXAMINER  
SPE 3663